

CAMCORDERS

INTRODUCTION

Photos are fine for recording some important moments or special occasions, but others, such as a child's first steps, really need to be captured on video. Fortunately, a good camcorder now costs very little, and with the right equipment it's easy to send a DVD or email a video clip to anyone anywhere in the world.

Camcorders have become easier to use, too. Most still use standard MiniDV tapes, but others record directly to DVD. Some even store hours of video on a built-in hard disk, ready to be copied quickly to your PC with no fuss.

This month we've tested 12 of the latest camcorders. Tape, DVD and hard disks all have advantages and disadvantages, so we've tested all three. One camera even uses both DVD and a hard disk. Whatever you want to spend, and however you want to record your video, we'll help you find the perfect camcorder for your creations.

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FILM STARS



Relive your life through a lens with 12 of the best camcorders around. Whether you want to record movies to tape, DVD or hard disk, we have the product for you

Choosing a... Camcorder

There are two key factors to consider when buying a camcorder: image quality and the way you want to store your video. Hard disk and DVD models tend to be more expensive than MiniDV ones, but each has its own strengths and weaknesses. Read our guide to find out what will work best for you.

HOME TAPING

Choosing a storage format is probably the hardest part of picking a camcorder. When deciding, you need to consider how much video you want to record and how you want to edit and view it afterwards.

MiniDV camcorders capture video to 60-minute tapes. These are available for less than £2 each and you can reuse them numerous times. You can play the recorded footage through a video output, or capture it to your PC and edit it. After editing you can either burn it to DVD or, if your camera has a DV input, copy it back to a MiniDV tape for storage.

DVD camcorders store video on a variety of 8cm writable and rewritable discs. The most useful format is DVD-RW. These discs hold only 20 minutes of footage if you use the highest quality settings, but you can reuse them up to 1,000 times and they cost around £1.50. You can select clips from the disc using a menu

with thumbnails and play them back through a video output. Alternatively, you can finalise the disc and play it back on most DVD players, or use it to copy the files to your PC for editing.

Hard disk camcorders can store more video than other types – some models hold up to seven hours of video at the highest quality settings. You can browse stored video using thumbnails and play it back through a video output, or link the camcorder to your PC by USB and copy the video files for editing.

QUALITY CONTROL

Video quality is largely related to the size of the camcorder's sensor, which is usually given as a fraction of an inch. The bigger the sensor, the more light it can pick up, resulting in less noise, better-defined edges and more detail. A CCD with plenty of pixels can also double as a digital camera. Our reviews explain which camcorders recorded sharp, vivid video, and which didn't. Most camcorders can record still images as well. None can rival the quality of a dedicated digital stills camera, but our reviews explain which are adequate and which are best avoided.

Most of the camcorders here use a single CCD sensor, but Panasonic's NV-GS180 uses three CCDs,



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one each for red, green and blue light. This gives its video a more realistic colour palette and reduces noise. Sony's DCR-DVD505E uses a CMOS sensor rather than the CCD technology in the other cameras, but we weren't particularly impressed by the quality of its results.

All the DVD and hard disk camcorders compress the video they record using MPEG2. This removes information from the footage, which can be a problem even on the highest quality settings. We particularly noticed compression-related problems in low light, and during fast action and camera pans. Poor-quality video suffers more under MPEG2 compression because of the quantity of noise in the original. MiniDV camcorders don't have compression problems, but even the best-quality video will be encoded in MPEG2 if you later write it to a DVD.

WIDE SARGASSO CCD

If you have a widescreen TV you'll want to shoot widescreen footage to match. All the camcorders here, with the exception of Samsung's VP-D463, are capable of this. Most cameras record widescreen video anamorphically, so the wide image is squeezed to fit the standard PAL television resolution. When you play back the video your widescreen TV stretches the image back out to fit. Panasonic's NV-GS37 isn't so good, though, as it simply uses a letterbox system to mask the top and bottom of a

standard frame of video. This gives a widescreen picture, but with less detail in each frame.

Most of the camcorders tested use 2.7in widescreen LCDs with a resolution of 560x220 pixels. There's little to distinguish most of these displays, but we've noted in our reviews where any are particularly good or bad. Some still use squarer 2.5in displays, though, and these have to be letterboxed to show a widescreen image.

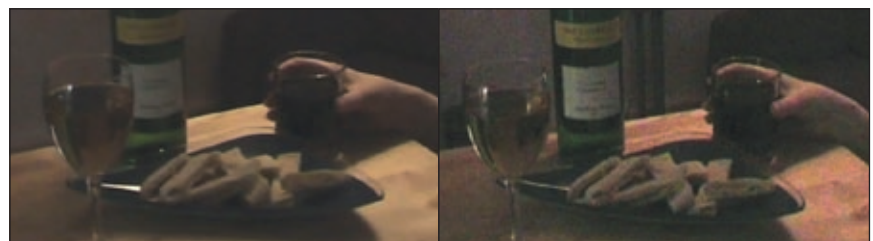
IMAGE STABILISATION

All the camcorders here have electronic image stabilisers. These use a proportion of the sensor as a buffer area when shooting video to smooth

out shaky camera work. For more information on image stabilisation, see *How it Works* on page 163. Using the stabilisation systems reduces the amount of sensor space used to record video, but we noticed the difference in video quality only on camcorders with small $\frac{1}{2}$ in CCDs. We shot all our indoor tests with image stabilisation active.

As well as FireWire or USB connectors, most camcorders here have an analogue A/V output that combines composite video and stereo audio into one easy connection. Some also have S-video outputs for a better-quality signal. The Sony DCR-HC96E also has video inputs for capturing analogue video to MiniDV tape.

Shady dealings Filming in low light



▲ More expensive camcorders tend to produce better video when filming in low light. Canon's inexpensive MV930, right, produces a jagged-looking image with white speckles of noise. The more expensive Sony DCR-HC96E, left, produces a more natural image with far less noise



CANON MV930

★★★★★

£208 inc VAT



Canon's MV960 won our award for Best Video Product in 2006, so we had high hopes for the nearly identical MV930.

FEATURES

The MV930's slim, upright design fits large hands well. The lens has a sliding cover, so you don't have to fiddle with a lens cap. It has USB and FireWire outputs for transferring video to a PC, but with no FireWire input you can't record edited footage back to tape. An SD card slot lets you store still photos, but with a resolution of only 1,024x768 it's not really worth it.

The 2.7in widescreen LCD is identical to the displays on pricier models, and a button on the edge increases the brightness for use on sunny days. A small joystick allows you to navigate the straightforward menu system, and novices can engage Easy mode to keep things simple.

PERFORMANCE

The MV930's video quality was the best of the budget models. Outdoor footage was impressive, and objects had crisp edges. There was some noise but less than we'd expect from a camcorder with a $\frac{1}{2}$ in CCD. In low light there was a lot of noise, with poor detail and colour accuracy. If you often film in low light, you'll need a camcorder with a bigger CCD.

Outdoors the MV930 was the best of the budget camcorders, although under close examination its footage lacks detail and colours are not quite true to life. Its 25x optical zoom is useful for filming distant subjects.

The MV930 records widescreen video with hardly any cropping at the top and bottom of the image. If you engage the Electronic Image Stabilisation (EIS) as well, though, you lose the top and bottom edges of the picture. The small battery lasted just 55 minutes in our test.

VERDICT

The MV930 is the best budget camcorder here, and a bargain at £208. It's a great choice for filming both indoors and outdoors, but if you need to film in challenging lighting conditions you should consider spending more.

SUMMARY

- ✓ Good-quality video
- ✓ Big optical zoom
- ✗ Short battery life; no FireWire input

BUDGET MINIDV CAMCORDER MiniDV cassette storage, 25x optical zoom, 800,000-pixel $\frac{1}{2}$ in CCD, 2.7in LCD screen, FireWire out, USB interfaces, A/V out

PART CODE 1210B05AA

SUPPLIER www.amazon.co.uk

DETAILS www.canon.co.uk



PANASONIC NV-GS37

★★★

£210 inc VAT

Panasonic's NV-GS17 won a Budget Buy award in our last camcorder group test. Sadly, this model hasn't kept up with the competition.

FEATURES

The most obvious disappointment is the NV-GS37's widescreen features. If you shoot in widescreen, the only option available is letterboxing, where the camera crops the top and bottom of the image. The LCD screen is shaped in the traditional 4:3 aspect ratio too, so it's not ideal for composing widescreen pictures. The camcorder has an unusually low and wide shape because of its side-loading tape mechanism, which made it hard to hold.

The battery protrudes at the back, but the viewfinder extends further so you can get your eye to it. The battery lasted for an impressive one hour and 45 minutes. The camcorder is controlled by a simple dial and joystick, both of which rest under your thumb. The menu system is clearly labelled and easy to navigate.

The lens is protected by a standard lens cap, which is a pain to remove and replace every time you want to shoot video. A video lamp helps when shooting in very dark conditions, but it's only useful at short range. There's no memory card slot for storing still images.

PERFORMANCE

The NV-GS37 couldn't quite compete with Canon's MV930 for video quality. Footage shot indoors was acceptable but lacked some of the MV930's sharpness and suffered from more noise. In low light the noise level increased massively. Colours were very washed out and detail vanished in dark areas.

Things improved considerably outdoors, and there is little difference between footage from the NV-GS37 and the MV930. The 30x optical zoom is great, but it's outdoors that you'll most miss a proper widescreen mode.

VERDICT

The NV-GS37 records decent video in well-lit conditions, but with no anamorphic widescreen mode most people would be better off choosing the MV930.

SUMMARY

- ✓ Decent-quality video; big optical zoom
- ✓ Long battery life
- ✗ No FireWire input; poor widescreen mode

BUDGET MINIDV CAMCORDER MiniDV cassette storage, 30x optical zoom, 800,000-pixel $\frac{1}{2}$ in CCD, 2.5in LCD screen, FireWire out, USB interfaces, A/V out

PART CODE NV-GS37

SUPPLIER www.cameras2u.com

DETAILS www.panasonic.co.uk



SAMSUNG VP-D463

★★

£222 inc VAT

It's only a little more expensive than the other budget camcorders, but Samsung has managed to include a few extra features for the money.

FEATURES

Unlike the cheapest Canon and Panasonic cameras, the VP-D463 has a FireWire port that can be used for output and input, so you can copy edited footage from your PC back to tape for storage. A microphone jack is provided too, but there's no accessory shoe for mounting an external microphone.

As well as recording to MiniDV tape, the VP-D463 can record MPEG4 video to memory card at a resolution of 720x576 pixels. This could be useful if you want to record video and quickly upload it to the internet. The A/V output supports S-video, giving a good quality picture if your TV has an S-video input.

The camcorder is small, but looks a little boxy. The 2.5in LCD is a little dull, and it's not widescreen either. Surprisingly, this camcorder has no widescreen shooting modes. The menu system is clearly laid out and fairly easy to navigate using the jog dial by your index finger.

PERFORMANCE

Whether recording to DV tape or memory card, the quality of video was poor. Indoors there was an excessive amount of noise, even in well-lit conditions, and the edges of objects weren't well defined. In low light it had trouble focusing, noise increased further and there was no detail in darker areas.

Outdoors it fared little better. The results were greyish and darker than expected. Detail was poor, and there was plenty of image noise.

The battery mounted on the rear of the camcorder is rated at 800mAh. It lasted for a respectable hour and 25 minutes, but given its size we expected it to run for much longer.

VERDICT

This camcorder includes some useful features, but it has no widescreen mode and the video it records is poor. We prefer Canon's MV930, which is cheaper and records better footage.

SUMMARY

- ✓ Records MP4 video to memory card
- ✗ No widescreen mode
- ✗ Poor video quality

BUDGET MINIDV CAMCORDER MiniDV, Memory Stick storage, 10x optical zoom, 800,000-pixel $\frac{1}{2}$ in CCD, 2.5in LCD screen, FireWire in/out, USB interfaces, A/V out, S-video out

PART CODE VP-D463

SUPPLIER www.empiredirect.co.uk

DETAILS www.samsung.com/uk



CANON MVX460

★★★★★

£311 inc VAT

The MVX460 impressed us when we reviewed it in *What's New, Shopper* October 2006. Five months on, it's still a great MiniDV camcorder.

FEATURES

The MVX460 is the smallest of the three pricier MiniDV models, thanks in part to the unusual placement of its battery, which is tucked away behind the LCD. This design prevents you from using a larger replacement if required, but with its stunning battery life of two hours and 32 minutes you probably won't need to.

On the front is a built-in lens cover, which is manually controlled using a switch. Beside the lens is a video lamp consisting of two white LEDs for shooting in dark conditions.

The rear of the camcorder is a mess of fiddly controls, many of which are hard to reach with one hand. It's a little uncomfortable to hold, especially if you have large hands. Above the controls you'll find an A/V output and a microphone jack, but there's no accessory shoe. The FireWire input allows you to record edited footage back to tape.

PERFORMANCE

Video recorded by the MVX460 was generally good quality. In our indoor tests it produced crisp video with plenty of detail, and film taken in good lighting conditions had little noise. It couldn't record colours as accurately as the Panasonic NV-GS180, though. In low light it performed well, recording far less noise than the best budget models and with detail visible even in the darker areas of the shot.

Outdoors it was more than acceptable, capturing far more detail than the budget MiniDV cameras. It also benefits from a slightly wider angle of view in widescreen mode. Still photos have a resolution of just 1,152x864 pixels and there's no flash. If you want to take still pictures, consider the DCR-HC96E instead.

VERDICT

This is a very capable camcorder that has all the features most users need. It's a good choice if you want a small camcorder, but otherwise Sony's DCR-HC96E is better.

SUMMARY

- ✓ Great-quality video
- ✓ Very long battery life
- ✗ Fiddly controls

MINIDV CAMCORDER MiniDV cassette storage, 20x optical zoom, 1,330,000-pixel $\frac{1}{2}$ in CCD, 2.7in LCD screen, FireWire in/out, USB interfaces, A/V out
PART CODE 1180B007AA
SUPPLIER www.pixmania.co.uk
DETAILS www.canon.co.uk



PANASONIC NV-GS180

★★★★★

£281 inc VAT

Panasonic's NV-GS150 performed excellently in our Labs test in *Shopper* April 2006. Its successor, the NV-GS180, has a few differences but is £150 cheaper.

FEATURES

At £281, this model isn't much more expensive than the budget MiniDV models. Its grey plastic finish certainly looks more workmanlike than the stylish Canon and Sony models, though, and it has a fiddly manual lens cap.

On top of the camcorder is an accessory shoe for mounting extras such as microphones and lights. This doesn't provide power, so accessories will need batteries. A microphone input is also provided. The FireWire port doesn't support DV input, so you won't be able to copy edited movies back to tape for storage.

The NV-GS180 can shoot anamorphic widescreen video, but its LCD has a 4:3 ratio so it uses letterboxing to display the footage correctly. The usual Panasonic menu system is controlled by a joystick under your thumb.

PERFORMANCE

The NV-GS180 uses three $\frac{1}{2}$ in CCDs for greater colour accuracy than cameras with just one. There was little appreciable noise in our well-lit indoor tests. In low light it performed far better than the budget models, with only light noise visible. Colours were acceptable, but the scene was a little dark and detail was lost.

Shooting outdoors showed the camcorder's capabilities. In natural light it produced very realistic results with sharp detail. Widescreen mode helps to create a truly cinematic feel.

The camcorder takes stills with resolutions of up to 1,760x1,320 by interpolating images from its three CCDs. The results look noisy, though, and there's no flash. The battery lasted an acceptable one hour and 22 minutes.

VERDICT

The NV-GS180's three CCDs re-create colours excellently, and its microphone and accessory shoe will appeal to some. With no widescreen LCD and poor still images, though, it's not quite as appealing as Sony's DCR-HC96E.

SUMMARY

- ✓ Great-quality video
- ✓ Standard accessory shoe and microphone input
- ✗ No FireWire input

MINIDV CAMCORDER MiniDV cassette storage, 10x optical zoom, three 800,000-pixel $\frac{1}{2}$ in CCDs, 2.5in LCD screen, FireWire out, USB interfaces, A/V out, S-video out
PART CODE NV-GS180EB-S
SUPPLIER www.purelygadgets.co.uk
DETAILS www.panasonic.co.uk



SONY DCR-HC96E

★★★★★

£347 inc VAT



Sony's most expensive consumer MiniDV camcorder comes with a wide range of features, and shoots high-quality video and decent stills.

FEATURES

The fairly large DCR-HC96E comes with a docking station with USB and FireWire ports, as well as pass-through connectors for power and AV. It supports input and output via FireWire, A/V and S-video, so you can capture digital or analogue video to MiniDV tape.

The large lens is protected by an automatic cover. It has a flash, which is essential for still photos, but no video light, so you'll have to use Sony's Nightshot setting instead. There aren't many controls on the camcorder itself, as the LCD doubles as a touch screen to navigate the menu system. It works well, but you can end up with smudgy fingerprints on your screen.

The accessory shoe on top of the camcorder has a proprietary Sony shape, but it provides power and can accept audio from a connected microphone. You shouldn't need it, though, as the DCR-HC96E has the best built-in mic of any of the MiniDV camcorders.

PERFORMANCE

The quality of video shot indoors was excellent, with more detail than even Canon's MVX460 could muster. In low light it was better still, with the big $\frac{1}{2}$ in CCD producing video with barely any noise, crisp detail and good skin tones. If you need to shoot video in poor light, this is a great choice. Video shot outdoors was equally impressive, with colours rivaling those of the NV-GS180 and more detail.

The DCR-HC96E can take decent photos, and it has a flash, too. The pictures can't match those taken with a dedicated stills camera, but they are good enough to print at normal sizes.

VERDICT

It's a bit large and rather expensive, but this camera takes great-looking video in all conditions and can double as a stills camera. It's the best of the pricier MiniDV models.

SUMMARY

- ✓ Excellent video quality
- ✓ FireWire, A/V and S-video inputs
- ✗ Quite large

MINIDV CAMCORDER MiniDV cassette storage, 10x optical zoom, 3,310,000-pixel $\frac{1}{2}$ in CCD, 2.7in LCD screen, FireWire in/out, USB interfaces, A/V in/out, S-video in/out
PART CODE DCRHC96E
SUPPLIER www.purelygadgets.co.uk
DETAILS www.sony.co.uk



JVC GZ-MG57EK

★★★★

£369 inc VAT

Hard disk camcorders such as this let you record hours of video without having to worry about tapes or discs.

FEATURES

The GZ-MG57EK is the smallest and lightest camera in the group, so it's ideal if you need to carry your camcorder regularly. Nonetheless, it's comfortable to use, even if you have large hands, and with most of the controls under the LCD it's pleasingly simple to operate. Sadly, the small body means there's no viewfinder.

JVC has fitted a 30GB hard disk inside, which gives seven hours of storage if you record video at the highest possible quality. The device stores video files on its hard disk with an unusual .MOD file extension, but you can open them in Windows Media Player.

Despite the camcorder's small size, JVC has squeezed in an S-video output as well as the usual A/V and USB ports. A widescreen display opens out from the body, and a small joystick placed conveniently beside it lets you navigate the simple menu system or pick clips from the hard disk for playback.

PERFORMANCE

Footage recorded on the GZ-MG57EK wasn't as impressive as we'd expect from a $\frac{1}{2}$ in CCD. Noise wasn't excessive, but colours looked washed out in various lighting conditions. Even on the highest settings you can see the effect of the MPEG2 video compression used to save the footage. This is particularly noticeable in low light conditions, when shooting moving objects or when panning the camera.

The 16:9 widescreen mode produces nice wide-angle shots, so you can capture more of a scene. The battery lasts a respectable hour and 17 minutes, and you can fit a larger one if required. You can take still photos and store them to the hard disk or SD card, but the resolution is limited to only 1,280x960 pixels.

VERDICT

This is a convenient little camcorder that can store a lot of video, but you can get far better video quality from a cheaper MiniDV camera.

SUMMARY

- ✓ Compact and light; stores seven hours of video
- ✗ Poor-quality video
- ✗ No viewfinder

HARD DISK CAMCORDER Hard disk storage, 15x optical zoom, 1,330,000-pixel $\frac{1}{2}$ in CCD, 2.7in LCD screen, USB interfaces, A/V out, S-video out
PART CODE GZ-MG57EK
SUPPLIER www.purelygadgets.co.uk
DETAILS www.jvc.co.uk



SONY DCR-SR90E

★★★★

£528 inc VAT

Sony's hard disk camcorder looks huge when compared with JVC's dinky GZ-MG57EK, and it has a whopping price to match.

FEATURES

Like JVC, Sony has fitted a 30GB disk inside its hard disk camcorder, giving around seven hours of video storage at the highest quality setting. You can drag and drop the files to your PC and play them in Windows Media Player. After installing the supplied software on your PC you can use the DVD Burn button on the camcorder. This automatically sends all new files to your PC and burns them to a disc.

Like all Sony camcorders, the DCR-SR90E has a touch-screen display for browsing thumbnails, playing clips and accessing menu functions. The powered accessory shoe on top of the device works only with Sony accessories.

A four-way microphone captures surround sound, which is encoded to Dolby Digital 5.1. This makes little difference in practice, as the effect is minimal. The lens cover is automatic, and there's a flash for taking still photographs.

PERFORMANCE

This camcorder uses the same lens and $\frac{1}{2}$ in CCD sensor as the company's DCR-HC96E. It produces higher-quality video than every other DVD and HDD camcorder here. Colours are vibrant yet realistic, the edges of objects are sharp and results are excellent even in low light.

However, like all the devices that record in MPEG2 format, the DCR-SR90E's videos suffer from compression artefacts. This is particularly noticeable during fast action and panning shots. We also noticed that this camcorder and the DCR-HC96E have lenses with a marginally narrower angle than the others. It takes good still photos, though, which you can save to Memory Stick or the hard disk. The battery on the back lasted for just over two hours.

VERDICT

This excellent camcorder provides high-quality video capture with the convenience of a hard disk. However, the DCR-HC96E produces even better video and costs £180 less.

SUMMARY

- ✓ Good video quality; good battery
- ✓ Seven hours of video storage
- ✗ Quite large; expensive

HARD DISK CAMCORDER Hard disk storage, 12x optical zoom, 3,310,000-pixel $\frac{1}{2}$ in CCD, 2.7in LCD screen, USB interfaces, A/V out
PART CODE DCRSR90E
SUPPLIER www.pcvworld.co.uk
DETAILS www.sony.co.uk



HITACHI DZ-HS301E

★★★★

£395 inc VAT

At first glance the DZ-HS301E looks like a traditional MiniDV camcorder, but Hitachi has squeezed in both a DVD drive and a hard disk.

FEATURES

The camcorder's 8GB hard disk stores just under two hours of recording at the highest quality settings, which is equivalent to two MiniDV tapes. You can also record directly to DVD, which limits you to 20 or 30 minutes depending on the settings, or copy recordings from the hard disk directly to DVD.

Alternatively, you can transfer video from the hard disk to your PC via USB, although you can't simply drag and drop files from the camera. Instead you must use the supplied software, which is an annoyingly slow process.

Behind the widescreen LCD there are seven touch-sensitive buttons for regularly used functions. The menu system is controlled by a small joypad on the side of the camcorder. It's a little awkward to use unless you reverse the LCD screen and fold it back against the body.

The camera has an unpowered accessory shoe and microphone input, so you can mount an external microphone if you wish. There's no flash or video lamp, though, and still photographs are limited to a low resolution.

PERFORMANCE

The battery lasted for just over an hour when recording to DVD, but this improved to an hour and a half when using the hard disk.

Video shot in static indoor scenes is on a par with that from Canon's MVX460. In low light, however, the video was rather dark and the MPEG2 compression reduced detail levels. Outdoors it produced vibrant colours and reasonable detail, but pans were again spoilt by MPEG2 compression. It shoots widescreen video with an impressively wide angle.

VERDICT

Some users may appreciate the ability to record video on a hard disk and burn DVD copies immediately, but Canon's DC19 costs less and produces better-quality video.

SUMMARY

- ✓ Hard disk and DVD storage
- ✓ Standard accessory shoe and microphone input
- ✗ Small hard disk; expensive

DVD/HARD DISK CAMCORDER DVD-R, DVD-RW, DVD-R DL, DVD-RAM, hard disk storage, 15x optical zoom, 1,330,000-pixel $\frac{1}{2}$ in CCD, 2.7in LCD screen, USB interfaces, A/V out, S-video out
PART CODE DZ-HS301E
SUPPLIER www.pixmania.co.uk
DETAILS www.hitachidigitalmedia.com



CANON DC19

★★★★★

£324 inc VAT



If our lab tests were decided on looks alone, Canon's DC19 would certainly be a winner this month. Happily, it's a great camcorder too.

FEATURES

The DC19 is very slim and light. Its neat design is helped by the unusual placement of its battery, which is tucked away behind the LCD. This means you can't fit a bigger replacement, but it lasts for a decent one-and-a-half hours of recording. The slim design doesn't leave any space for an accessory shoe, however.

The front of the camcorder houses an automatic lens cover, a flash for still photos and a single LED video lamp for shooting in the dark. Due to the battery position most of the controls are squeezed on to the rear of the camcorder. It can be a bit confusing at first, but they're all within easy reach. A small joystick is provided for browsing clips to play back through the A/V or S-video outputs.

You can record video or stills to a range of DVD formats or capture stills to a Mini SD card. The viewfinder has a very small eyepiece, but it is angled upwards for easy access.

PERFORMANCE

The DC19 produces good-looking video thanks to its large $\frac{1}{2}$ in CCD. Barely any noise is visible in video shot under well-lit conditions. Images have plenty of detail and colours are bright and true to life. In low light it suffers from increased noise and compression artefacts, but it's better in dark conditions than the budget MiniDV cameras.

It performs well outdoors, and on the best quality settings only panning shots suffer from compression artefacts. It's also capable of taking decent photos with resolutions of up to 1,632x1,224 pixels. Photos looked well balanced and were full of detail.

VERDICT

This is the best DVD camcorder for the money. MiniDV cameras allow you to record for longer, but if you want the convenience of recording directly to disc, this is a great way to do it.

SUMMARY

- ✓ Compact and lightweight
- ✓ Good video quality
- ✗ 20 minutes of video per disc at highest quality

DVD CAMCORDER DVD-R, DVD-RW, DVD-R DL storage, 10x optical zoom, 2,200,000-pixel $\frac{1}{2}$ in CCD, 2.7in LCD screen, USB interfaces, A/V out, S-video out

PART CODE 1587B009AA
SUPPLIER www.ajelectronics.co.uk
DETAILS www.canon.co.uk



PANASONIC VDR-D100

★★★★

£253 inc VAT

This is the cheapest DVD camcorder in the group, but it doesn't have the immediate appeal of Canon's DC19.

FEATURES

The VDR-D100 is only a touch bigger and heavier than the DC19, but it feels bulkier in your hand. Despite this it's comfortable to hold and the controls are easy to reach. The lens is protected by a traditional lens cap. There's no video lamp and no way to take still photos.

To flip the LCD out from the body you must press a button, which is an unnecessary nuisance. The display isn't widescreen, but the camcorder can shoot widescreen video with a very wide angle. The well-organised menu system is controlled by a joystick, which you also use to browse clips from the DVD for playback through the A/V output.

The 1,150mAh battery on the rear lasts for almost two hours of recording. This is the best result from a DVD camcorder in the group, and you may run out of DVDs before the battery dies. The 30x optical zoom is ideal for framing distant objects. As well as the usual DVD-R/RW discs, it accepts DVD-RAM discs. These can be read by a compatible PC drive without being finalised first, saving you time and hassle.

PERFORMANCE

Video from the small $\frac{1}{2}$ in CCD is disappointing. It's not as sharp and suffers from more noise than video from the similarly specified MV930. The problems are compounded by MPEG2 compression artefacts, which reduce detail and give video shot in low light a soft, fuzzy feel.

Videos shot outside are better, but they still lack detail. Any quick panning shots suffer from compression artefacts that detract from the image quality. On the other hand, the widescreen mode captures a very wide angle that's ideal for filming cityscapes.

VERDICT

The VDR-D100 is about as cheap as DVD camcorders get, but its video quality isn't great. We recommend buying a cheaper MiniDV camera, or saving up for Canon's DC19.

SUMMARY

- ✓ Cheap for a DVD model; big optical zoom
- ✗ Poor video quality; LCD not widescreen
- ✗ 20 minutes of video per disc at highest quality

DVD CAMCORDER DVD-R, DVD-RW, DVD-RAM storage, 30x optical zoom, 680,000-pixel $\frac{1}{2}$ in CCD, 2.5in LCD screen, USB interfaces, A/V out

PART CODE VDR-D100
SUPPLIER www.pcwworld.co.uk
DETAILS www.panasonic.co.uk



SONY DCR-DVD505E

★★★

£565 inc VAT

Sony's DCR-DVD505E is the largest and most expensive DVD camcorder. It's also the only one that uses a CMOS sensor instead of a CCD.

FEATURES

The DCR-DVD505E's girth is due in part to its huge 3.5in widescreen LCD. This extra size makes a real difference. It has almost twice as many pixels as most camcorder screens, letting you see what you're shooting far more clearly and in much greater detail. The extra size makes the touch-screen menu system easier to navigate, too. There's also a viewfinder, which tilts up from the body for easy access.

A big lens dominates the front of the camcorder. It has an automatic lens cover and a built-in flash but no video lamp – if you want to film in the dark, you'll need to use the monochrome Nightshot mode. Just behind the lens is a surround-sound microphone, which the camera uses to record Dolby Digital 5.1 surround sound. Behind this is a proprietary Sony accessory shoe, which will power and communicate with compatible Sony add-ons.

PERFORMANCE

The DCR-DVD505E's widescreen mode captures an impressively wide angle. Outdoors the CMOS chip performed well, but couldn't match the other Sony cameras that use CCD sensors. Detail wasn't as sharp and we noticed a little more noise in the video we recorded.

Indoors it produced bright colours, but the edges of objects were crisper on video shot by Canon's DC19. Its results in low light looked better than those from the DC19, with only slight noise and good detail in even the darkest areas. Sadly, our footage was marred by mild compression artefacts, even at the highest settings, and especially in low light and action shots. Our still photos looked good, though, and will suffice for small prints.

VERDICT

The DCR-DVD505E's big LCD is attractive, but the price simply isn't justified by its video quality. The DC19 is a better DVD camcorder, and Sony's own DCR-HC96E is better still.

SUMMARY

- ✓ Big LCD screen
- ✗ 20 minutes of video per disc at highest quality
- ✗ Quite large; expensive

DVD CAMCORDER DVD-R, DVD-RW, DVD+RW storage, 10x optical zoom, 2,100,000-pixel $\frac{1}{2}$ in CMOS, 3.5in LCD screen, USB interfaces, A/V out

PART CODE DCRDVD505E
SUPPLIER www.pixmania.co.uk
DETAILS www.sony.co.uk

BUDGET MINIDV CAMCORDERS



MANUFACTURER	CANON	PANASONIC	SAMSUNG	CANON	PANASONIC	SONY
Model	MV930	NV-GS37	VP-D463	MVX460	NV-GS180	DCR-HC96E
Rating	★★★★★	★★★	★★	★★★★	★★★★	★★★★★
RECORDING						
Optical zoom	25x	30x	10x	20x	10x	10x
Digital zoom	800x	1,000x	900x	800x	500x	500x
Sensor	1/2in CCD	1/2in CCD	1/2in CCD	1/2in CCD	3x 1/2in CCD	1/2in CCD
Sensor pixels	800,000	800,000	800,000	1,330,000	3x 800,000	3,310,000
Widescreen mode	Anamorphic	Letterbox	None	Anamorphic	Anamorphic	Anamorphic
LCD screen size	2.7in	2.5in	2.5in	2.7in	2.5in	2.7in
Viewfinder	Colour	Colour	Colour	Colour	Colour	Colour
Video lamp	No	Yes	No	Yes	No	No
Video recording format	DV	DV	DV, MPEG4	DV	DV	DV
Video recording media	MiniDV cassette	MiniDV cassette	MiniDV, Memory Stick	MiniDV cassette	MiniDV cassette	MiniDV cassette
Sound	16-bit stereo	16-bit stereo	16-bit stereo	16-bit stereo	16-bit stereo	16-bit stereo
Maximum still image resolution	1,024x768	N/A	800x600	1,152x864	1,760x1,320	2,016x1,512
Memory slot (card supplied)	SD slot (none)	None (none)	Memory Stick (none)	SD slot (none)	SD slot (none)	Memory Stick DUO (none)
Camera flash	No	No	No	No	No	Yes
PHYSICAL						
Digital inputs/outputs	FireWire out, USB Hi-Speed	FireWire out, USB Hi-Speed	FireWire in/out, USB Hi-Speed	FireWire in/out, USB Hi-Speed	FireWire out, USB Hi-Speed	FireWire in/out, USB Hi-Speed
Analogue inputs/outputs	A/V out	A/V out	A/V out, S-video out	A/V out	A/V out, S-video out	A/V in/out, S-video in/out
Other connections	Charge jack	Charge jack	Charge jack, microphone	Charge jack, microphone	Microphone, accessory shoe (unpowered)	Charge jack, Sony accessory shoe
Battery type	7.4V 530mAh Li-ion	7.2V 640mAh Li-ion	7.4V 800mAh Li-ion	7.4V 850mAh Li-ion	7.2V 640mAh Li-ion	7.2V 680mAh Li-ion
Battery life	55m	1h 45m	1h 25m	2h 32m	1h 22m	1h 33m
Battery charging position	Camcorder	Charger	Camcorder	Camcorder	Charger	Camcorder
Size (HxWxD)	92x49x115mm	69x86x120mm	75x54x102mm	77x57x109mm	73x71x123mm	91x72x120mm
Weight	445g	480g	360g	410g	410g	525g
BUYING INFORMATION						
Warranty	One year	One year	One year	One year	One year	One year
Price including VAT	£208	£210	£222	£311	£281	£347
Supplier	www.amazon.co.uk	www.cameras2u.com	www.empiredirect.co.uk	www.pixmania.co.uk	www.purelygadgets.co.uk	www.purelygadgets.co.uk
Details	www.canon.co.uk	www.panasonic.co.uk	www.samsung.com/uk	www.canon.co.uk	www.panasonic.co.uk	www.sony.co.uk
Part code	1210B005AA	NV-GS37	VP-D463	1180B007AA	NV-GS180	DCRH96E

HARD DISK CAMCORDERS

DVD/HARD DISK DVD CAMCORDERS



MANUFACTURER	JVC	SONY	HITACHI	CANON	PANASONIC	SONY
Model	GZ-MG57EK	DCR-SR90E	DZ-HS301E	DC19	VDR-D100	DCR-DVD505E
Rating	★★★	★★★	★★★	★★★★★	★★★	★★
RECORDING						
Optical zoom	15x	12x	15x	10x	30x	10x
Digital zoom	700x	800x	800x	200x	1,000x	120x
Sensor	1/2in CCD	1/2in CCD	1/2in CCD	1/2in CCD	1/2in CCD	1/2in CMOS
Sensor pixels	1,330,000	3,310,000	1,330,000	2,200,000	680,000	2,100,000
Widescreen mode	Anamorphic	Anamorphic	Anamorphic	Anamorphic	Anamorphic	Anamorphic
LCD screen size	2.7in	2.7in	2.7in	2.7in	2.5in	3.5in
Viewfinder	None	Colour	Colour	Colour	Colour	Colour
Video lamp	Yes	No	No	Yes	No	No
Video recording format	MPEG2	MPEG2	MPEG2	MPEG2	MPEG2	MPEG2
Video recording media	Hard disk	Hard disk	DVD-R, DVD-RW, DVD-R DL, DVD-RAM, hard disk	DVD-R, DVD-RW, DVD-R DL	DVD-R, DVD-RW, DVD-RAM	DVD-R, DVD-RW, DVD+RW
Sound	Dolby Digital Stereo	Dolby Digital 5.1	Dolby Digital Stereo	Dolby Digital Stereo	Dolby Digital Stereo	Dolby Digital 5.1
Maximum still image resolution	1,280x960	2,016x1,512	1,280x960	1,632x1,224	N/A	2,304x1,728
Memory slot (card supplied)	SD slot (none)	Memory Stick DUO (none)	SD slot (none)	SD slot (none)	None (none)	Memory Stick DUO (none)
Camera flash	No	Yes	No	Yes	No	Yes
PHYSICAL						
Digital inputs/outputs	USB Hi-Speed	USB Hi-Speed	USB Hi-Speed	USB Hi-Speed	USB Hi-Speed	USB Hi-Speed
Analogue inputs/outputs	A/V out, S-video out	A/V out	A/V out, S-video out	A/V out, S-video out	A/V out	A/V out
Other connections	Charge jack	Charge jack, Sony accessory shoe	Microphone, accessory shoe (unpowered)	Charge jack	Power jack	Charge jack, Sony accessory shoe
Battery type	7.2V 700mAh Li-ion	7.2V 1,000mAh Li-ion	7.2V 680mAh Li-ion	7.4V 850mAh Li-ion	7.2V 1,150mAh Li-ion	7.2V 1,000mAh Li-ion
Battery life	1h 17m	2h 1m	1h 6m	1h 29m	1h 58m	1h 43m
Battery charging position	Camcorder	Camcorder	Charger	Camcorder	Charger	Camcorder
Size (HxWxD)	68x69x109mm	78x76x128mm	87x59x125mm	91x51x126mm	87x53x129mm	90x55x147mm
Weight	410g	615g	490g	450g	515g	630g
BUYING INFORMATION						
Warranty	One year	One year	One year	One year	One year	One year
Price including VAT	£369	£528	£395	£324	£253	£565
Supplier	www.purelygadgets.co.uk	www.pcworld.co.uk	www.pixmania.co.uk	www.ajelectronics.co.uk	www.pcworld.co.uk	www.pixmania.co.uk
Details	www.jvc.co.uk	www.sony.co.uk	www.hitachidigitalmedia.com	www.canon.co.uk	www.panasonic.co.uk	www.sony.co.uk
Part code	GZ-MG57EK	DCRSR90E	DZ-HS301E	1587B009AA	VDR-D100	DCRDVD505E

Labs verdict Camcorders

Whether you want an inexpensive camcorder that records great video, the convenience of writing directly to DVD or the best possible video quality, you'll find the perfect camcorder in this test.

If you're on a tight budget, we recommend Canon's MV930. It's easy to use, inexpensive and shoots great video in all but the most challenging lighting conditions. It's a worthy winner of our Budget Buy award.

For a more powerful model that records excellent video, we recommend Sony's DCR-HC96E. It's more expensive, but the quality of its footage is well worth the price and it has many useful features. It's our Best Buy.

If you want the convenience of recording directly to a DVD, we recommend Canon's DC19. It looks fantastic, records good-quality video and won't break the bank either. It's our Best Buy DVD camcorder. **ES**

BUDGET MINIDV CAMCORDER



CANON
MV930
★★★★★

MINIDV CAMCORDER
SONY
DCR-HC96E
★★★★★

DVD CAMCORDER
CANON
DC19
★★★★★

